

# Superfund Program Proposed Plan

## Crossley Farm Site

Huff's Church, Hereford Township, Berks County, Pennsylvania February 1997

### EPA ANNOUNCES PROPOSED PLAN

The U.S. Environmental Protection Agency (EPA) is issuing this Proposed Remedial Action Plan (Proposed Plan) to present its Preferred Remedial Alternative for addressing residential drinking water supplies at the Crossley Farm Superfund Site (Site) located approximately 7 miles southwest of Allentown (Figure 1). This Proposed Plan summarizes information obtained from a recently completed **Focused Feasibility Study (FFS)**, as well as previous residential

#### Dates to remember:

**February 10 - March 12 1997**

Public comment period  
on alternatives in Proposed Plan.

**March 5 1997, 7:00 p.m.**

Public meeting at the  
Washington Township Elementary School  
1406 Route 100  
Barto, Pennsylvania 19504

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well sampling, and describes the remedial alternatives EPA is considering for the Site.

EPA's Preferred Action is to provide point of entry treatment systems to the residents who are impacted by contamination from the Site and to provide the potential for additional residential point of entry systems if needed in the area of the Site. The filter treatment units will be maintained and residential wells would be periodically monitored.

This action is considered a response to one of EPA's concern about the residential drinking water. EPA refers to this as an interim action for the Site. EPA's second concern is the regional groundwater contamination. EPA is

currently investigating the soil, sediment and surface water as well as the extent of regional groundwater contamination and when that study is completed EPA will propose a final remedy for the entire Site. The investigation is expected to continue through the summer of 1997 and final reports should be available by the Spring or Summer of 1998.

At that time, EPA will issue another proposed plan which will include some of the alternatives included in this plan and some new alternative for clean up of the regional groundwater contamination. Therefore this proposed remedy is considered interim until the **Remedial Investigation and Feasibility Study** is finished.

The EPA has prepared this Proposed Plan to solicit public comment on the preferred alternative and the other alternatives under evaluation. EPA will select a remedy for the Site only after the public comment period has ended and comments received during the comment period have been reviewed and considered. The remedy will be presented in a **Record of Decision (ROD)** for the Site. Based on new information and/or comments received, the remedy selected in the ROD may be different from the preferred alternative described in this Proposed Plan.

The Proposed Plan is being issued as part of EPA's public participation requirements under Sections 113(k), 117(a), and 121(f) of the **Comprehensive Environmental Response, Compensation, and Liability Act** of 1980, as amended (**CERCLA**). The public's comments will be considered and discussed in the **Responsiveness Summary** section of the ROD for the Site. This Proposed Plan summarizes information that can be found in greater detail in the FFS report and in other documents contained in the **Administrative Record** file for the Site. EPA encourages the public to review these documents in order to gain a more complete understanding of the Site and the Superfund activities that have been conducted there. The locations of the Administrative Record file for the Site and the address to send comments on this Plan are given at the back of the Proposed Plan. The Proposed Plan also contains a glossary of terms that may be unfamiliar to the general public. The terms in bold print in the text are more fully defined in the glossary in the back of the Proposed Plan.

## **I. SCOPE AND ROLE OF RESPONSE ACTION**

This Site has been divided into two Operable Units. This proposed plan addressed the first operable unit for the residential drinking water supplies and the second will investigate the soil, sediment, surface water and the extent of the groundwater contamination. As part of the groundwater investigation, EPA will install new monitoring wells at several locations and at three depths in each location. The monitoring wells will then be sampled and the water will be analyzed to determine the spatial distribution of Site-related contaminants. Following the investigation, EPA will develop separate remedial alternatives, if appropriate, for the full Site remediation.



FIGURE 1  
SITE LOCATION MAP

AR300370

## II. SITE BACKGROUND AND HISTORY

The Crossley Farm Site is located in the Huffs Church community of Hereford Township, Berks County, Pennsylvania. The site is located along the southern side of Huffs Church Road, approximately 3 miles west-northwest of State Route 100 and northwest of the borough of Bally. The general Site features are shown on Figure 2.

The Site is located in the Reading Prong Physiographic Province. The topography reflects the complex underlying bedrock geology and consists of high hills and ridges underlain by bedrock. The most prominent highland within the study area occurs at the Site and is known locally as Blackhead Hill. The hill is very steeply sloped to the west and south of its crest. To the north and east of its crest, the hill is fairly level or flat and supports a working farm over much of its area. The crest of Blackhead Hill is underlain by the Hardyston Quartzite, which makes an attractive building stone. A small quarry at the crest of the hill has had some limited activity for nearly 50 years.

From the mid-1960s to the mid-1970s, a local plant reportedly sent numerous drums to the Crossley Farm for disposal. These drums contained mostly liquid waste and were described as having a distinctive "solvent" odor. The plant was believed to have used trichloroethene (TCE) as a degreaser from at least the mid-1960s until 1973 and tetrachloroethene (PCE) from at least the early 1960s until 1980.

Known and alleged waste disposal areas include a household dump, the quarry, and a borrow pit area. The dump is located approximately 2,000 feet south of Huffs Church Road and reportedly consists chiefly of household trash. The quarry is located approximately 3,000 feet south of Huffs Church Road and is allegedly a former site of unregulated disposal of hazardous waste, chiefly chlorinated solvents. The borrow area is located approximately 400 feet east of the quarry and is allegedly a former unregulated staging and/or disposal area of hazardous wastes, chiefly chlorinated solvents. All of these suspected source areas are being investigated by the ongoing remedial investigation.

Regulatory involvement at this Site began in 1983, when local residents complained to the Pennsylvania Department of Environmental Protection (PADEP) about odors in private water supply wells. A PADEP sampling program of local wells conducted in September 1983 revealed concentrations of TCE as high as 8,500 micrograms/liter (ug/L) and PCE as high as 110 ug/L. The Maximum Contaminant Levels (MCLs) for TCE and PCE established under the Safe Drinking Water Act are 5 ug/L for both compounds. A subsequent sampling round conducted by PADEP and EPA in November 1983 revealed that eight home wells contained detectable levels of TCE, and in six of these wells the concentrations of TCE exceeded 200 ug/L.

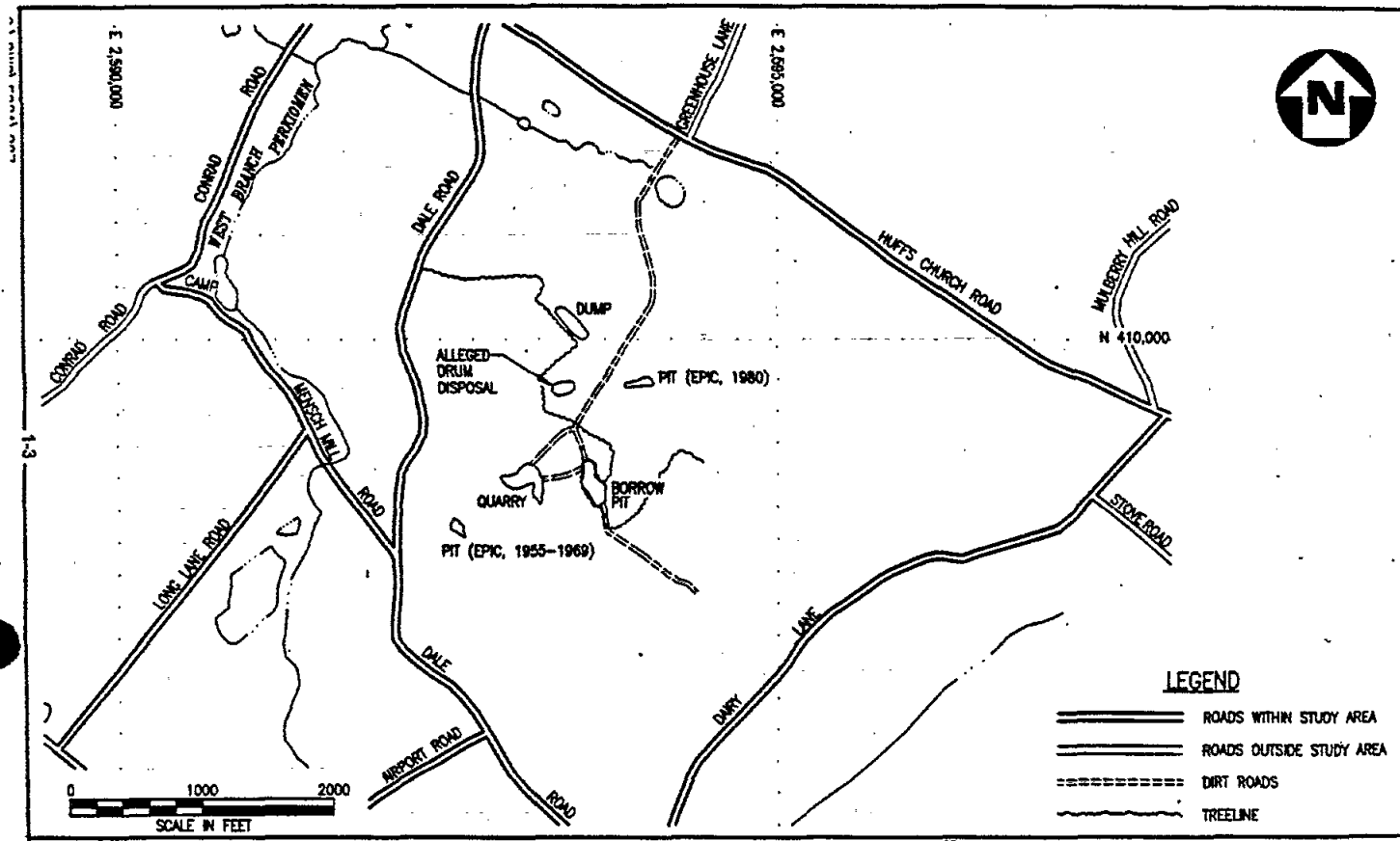


FIGURE 2  
GENERAL SITE FEATURES CROSSLEY FARM SITE

As a result of the November 1983 sampling, PADEP issued a health advisory on groundwater use in the area and recommended either boiling water, installing carbon filtration systems, or using bottled water where TCE concentrations exceeded 45 ug/L. Shortly thereafter, a temporary water supply was provided by the Pennsylvania National Guard through the Pennsylvania Emergency Management Agency. This supply was terminated in mid-1985.

After the health advisory was issued, local residents began to voice concerns about Crossley Farm and alleged dumping of wastes there. In response to these concerns, EPA conducted a preliminary assessment (PA) of the property. The PA, completed in June 1984, concluded that insufficient information existed to identify the source of the groundwater contamination and suggested that a regional groundwater study be conducted.

Further citizen complaints in August 1986 prompted additional rounds of sampling by EPA in September 1986. TCE levels detected during these rounds ranged up to 19,000 ug/L. Additional well sampling in November 1986 detected TCE at a maximum level of 22,857 ug/L.

EPA initiated an emergency response in December 1986 and, in January 1987, EPA began installing carbon filtration units on the most severely impacted private wells. A contaminant concentration level of 180 ug/L of TCE or greater was used as the criterion for installing a filter for any particular well. This criterion was developed in consultation with the Agency for Toxic Substances and Disease Registry (ATSDR) and was based on one-half of the Drinking Water Equivalent Level (DWEL). A total of 15 carbon filter units have been installed and are maintained by EPA. A contractor services the units approximately every 2 months, and the carbon units are rotated about every 6 months. EPA is still monitoring the operation of these treatment units.

In the spring of 1987, EPA initiated a regional hydrogeological investigation to include the installation and sampling of on-site and off-site monitoring wells and the sampling of residential well supplies. This investigation, completed in August 1988, concluded that the source of the TCE in the groundwater was near the crest of Blackhead Hill. The abandoned quarry and the borrow pit area were cited as the presumed source areas. The investigation delineated a contaminated groundwater plume extending approximately 7,000 feet downgradient from Blackhead Hill and along Dale Road.

Concurrent with and independent of the EPA study, residential wells near Dale Road were sampled and analyzed for polychlorinated biphenyls (PCBs) and other contaminants as part of a PADEP investigation of the Texas Eastern - Bechtelsville compressor station. One residential well located on Forgedale Road contained TCE at levels greater than 200 ug/L, suggesting that the TCE plume associated with the Crossley Farm Site extended even farther to the south than mapped, since TCE was

determined not to be a common waste product from compressor station operations. This result prompted additional sampling by EPA along Forgedale Road, south to Old Route 100, as part of the Crossley Farm investigation. These analytical data indicated that the plume extended south of the compressor station and Forgedale Road and about 9,000 feet downgradient from Blackhead Hill.

In February 1991, EPA issued the final Hazard Ranking System (HRS) package for the Crossley Farm Site in preparation for the Site's proposal for the National Priorities List (NPL). In July 1991, the site was proposed for the NPL. The Site was formally listed on the NPL in October, 1992.

In September 1994, EPA initiated a remedial investigation and feasibility study (RI/FS) for the Site to evaluate existing data, collect additional data as necessary and consider appropriate actions. EPA decided to expedite evaluation of alternatives to address the contaminated residential well supply problem by preparing a focused feasibility study (FFS) prior to completing of the remaining Site investigation activities.

### **III. NATURE AND EXTENT OF CONTAMINATION**

The full nature and extent of contamination in all media associated with the disposal of hazardous wastes on the Crossley Farm Site are unknown at this time and will be delineated by the remedial investigation. At present, significant data exist regarding the nature and lateral extent of volatile **organic compounds** in groundwater, and limited data exist regarding the nature of off-site semivolatile and **inorganic compounds** in groundwater.

#### **Volatile Organic Compounds**

Volatile organic compounds (VOCs) have been detected at significant levels in groundwater through the multiple sampling of 21 monitoring wells and numerous home wells. During the last sampling round (November/December 1995), nearly all potable wells and springs within the study area (a total of 104 different groundwater sources) were sampled for VOCs to support the FFS and to gather data to aid in the scoping of the remedial investigation. The analytical results from all sampling rounds indicate that a large plume of contaminated groundwater originates near the crest of Blackhead Hill and is migrating southward and downgradient approximately 9,000 feet into the Dale Valley. The principal chemical components of this plume are the VOCs trichloroethene (TCE) and tetrachloroethene (PCE), though a few other compounds also appear but much less consistently and at lower concentrations. Neither the precise source location(s) nor the vertical distribution of the extent of the contamination is known at this time.

## Semivolatile Organic Compounds

Limited data exist concerning the nature and extent of semivolatile organic compounds (SVOCs) at the Site. A total of 14 residential wells were analyzed during the September 1995 and/or the November/December 1995 sampling rounds for these compounds. No other wells or media have been analyzed for SVOCs. The limited data suggest that the groundwater is not significantly impacted by SVOCs. The wells selected for analysis are either located closest to the Site or historically have had the highest levels of VOCs in their groundwater. Therefore, they would be considered the wells most likely to contain SVOCs. The analyses, however, indicate that the distribution of SVOCs is irregular and their concentrations are very low (equal to or less than 1 ug/L). Di-n-butylphthalate, a plasticizer and common laboratory contaminant, was the only compound to occur in more than one sample; the maximum concentration of this compound was 1 ug/L. Tris(2-chloroethyl)phosphate, a flame-retardant plasticizer, was detected in three wells as a tentatively identified compound (TIC).

## Inorganic Compounds

Limited data exist concerning the nature and extent of metals at the Site. A total of 14 residential wells were analyzed for metals during the September 1995 and/or the November/December 1995 sampling rounds. No other wells or media have been analyzed for metals. The limited data suggest that off-site groundwater may be impacted by metals. Based on their concentrations relative to EPA Region III Risk Based Concentration Tables -1996, the metals cadmium, copper, iron, and manganese were all selected as chemicals of concern during the preliminary risk assessment conducted for the FFS. The concentrations of these metals in the monitoring wells are not known at this time. It is also not known what the naturally occurring background levels of these metals may be or to what extent plumbing may be contributing to the concentration levels of some of the metals (principally lead and copper) through the leaching of these metals from the pipes by acidic groundwater. These data gaps will be investigated during the remedial investigation.

## IV. SUMMARY OF SITE RISKS

The basis for EPA's risk determination is The National Oil and Hazardous Substances Pollution Contingency Plan ("NCP") which establishes acceptable levels of carcinogenic risk for Superfund sites ranging from one excess cancer case per 10,000 people exposed to one excess cancer case per one million people exposed. This translates to a risk range of between one in 10,000 and one in one million additional cancer cases. Expressed as scientific notation, this risk range is between  $1.0E-04$  and  $1.0E-06$ . Remedial action is warranted at a site when the calculated cancer risk level for a potentially exposed individual exceeds  $1.0E-04$ . However, since EPA's cleanup goal is generally to reduce the risk to  $1.0E-06$  or less, EPA also may take action where



the risk is within the range between 1.0E-04 and 1.0E-06.

The NCP also states that sites should not pose a health threat due to a non-carcinogenic, but otherwise hazardous, chemical. EPA defines a non-carcinogenic threat by the ratio of the contaminant concentration at the site that a person may encounter to the established safe concentration. If this ratio, known as the **Hazard Index (HI)**, exceeds one (1.0), there may be concern for the potential non-carcinogenic health effects associated with exposure to the chemicals. The HI identifies the potential for the most sensitive individuals to be adversely affected by the noncarcinogenic effects of chemicals. As a rule, the greater the value of the HI above 1.0, the greater the level of concern.

A **Draft Preliminary Risk Assessment (PRA)** was completed in October 1996 to assess the potential risks to human health that could result from using contaminated groundwater underlying the Site. The PRA was developed using analytical results from the historical sampling of residential wells (VOCs, only) and from the September, November, and December 1995 sampling rounds (VOCs, SVOCs, and inorganic compounds). The PRA reviewed and screened the analytical results from all the wells and springs within the study area for which data are available, a total of 136 different groundwater sources.

The PRA used the maximum detected concentrations for each well under the Reasonable Maximum Exposure (RME) scenarios to characterize the risks. These conditions represent a conservative approach and may not be representative of actual or typical conditions. Exposure scenarios for adults and children were developed for ingestion (drinking), dermal contact (skin contact), and inhalation (breathing) of contaminants through use of groundwater obtained from the residential wells.

The PRA determined that TCE is the major contributor of excess carcinogenic risk for most wells. Other COCs that individually contribute carcinogenic risk in excess of 1E-6 include PCE, chloromethane, methylene chloride, bromodichloromethane, chloroform, carbon tetrachloride, and 1,1-dichloroethene (1,1-DCE).

The PRA also identified TCE as the major contributor to noncarcinogenic risk, with an individual HQ exceeding 1.0. Manganese, PCE, and cis-1,2-dichloroethene have HQs exceeding 1.0 for children, and trichlorofluoromethane has an HQ exceeding 1.0 for adults.

The NCP Section 300.430 requires EPA to evaluate whether the proposed action meets the **Applicable or Relevant and Appropriate Requirements (ARARs)**. These requirements are promulgated, enforceable federal and state environmental, or public health requirements that are determined to be legally applicable or relevant and appropriate to the hazardous substances, remedial actions, or other circumstances at a CERCLA site.

In evaluating the risks for the Crossley Farm Site, ARARs include the federal Safe Drinking Water Act (SDWA) and MCLs and state standards, which regulate the quality of treated water produced by a public water supply. MCLs are promulgated numerical values that specify the maximum permissible levels of contaminants that can be delivered to a user of public water supplies. MCLs have been promulgated by both the federal government and the Commonwealth of Pennsylvania. For the Agency's remedy selection decision, MCLs are considered relevant and appropriate in evaluating the risk from contaminated drinking water supplies for the residents living near the Crossley Farm Site. Since the preliminary risk assessment indicates that TCE is the main contributor for both the carcinogenic and non-carcinogenic risk, the MCL of 5 micrograms per liter (ug/l) was also important for identification of the affected residents.

### **Remedial Action Objective**

The results of a preliminary human health risk assessment (based on historical and current residential well and spring sampling results) conducted for the FFS, and a comparison of contaminant levels from individual supplies to drinking water criteria, indicate that groundwater in the vicinity of the Crossley Farm Site poses unacceptable risks to human health. Consequently, the remedial action objective for this operable unit is to prevent human exposure to contaminated groundwater that exceeds federal or state MCLs or results in carcinogenic risk (greater than  $1E-4$ ) or noncarcinogenic risk (HI greater than 1.0) based on the drinking, skin contact, or breathing exposure routes.

A total of 31 wells were identified as requiring remedial action. The screening procedure produced a series of observations concerning the groundwater quality of each well relative to MCLs and the risks associated with the evaluated exposure pathways. Two of the 31 wells above MCLs are public water supply wells that provide water to a mobile home park. These wells were not considered further in the FFS because they are permitted wells that are required to periodically monitor groundwater quality and to provide potable water that meets the MCLs to its customers (the residents). The water from these wells is currently treated by granular activated carbon (GAC) prior to distribution.

## **V. SUMMARY OF REMEDIAL ALTERNATIVES**

### **Alternative 1: No Action**

The no-action alternative was developed, as required by the NCP, as a baseline to which other alternatives may be compared. Periodic reviews of Site conditions, typically every 5 years, and long-term groundwater monitoring would be the only activities conducted under this alternative.

There are no ARARs pertinent to the no-action alternative.

No capital costs are associated with the no-action alternative. The average annual cost for long-term monitoring is estimated to be \$44,120 and 5-year reviews are \$23,000 per event. Over a 30-year period, the net present-worth cost is \$597,117.

#### **Alternative 2: Delivered Water**

Under this alternative, bottled or bulk water would be regularly provided to each residence that has a water supply contaminated in excess of the federal or state primary drinking water criteria (MCLs) or risk-based levels.

Institutional controls such as ordinances or deed restrictions might be enacted to prohibit the use of contaminated groundwater for drinking water. Existing residential supply wells and selected monitoring wells would be incorporated into a long-term monitoring network. Groundwater would be monitored annually for VOCs and metals to assess the contaminant plume status and to assess whether additional homes may be at risk from contaminated water supplies. Because contaminants remain in the underlying aquifer and would continue to pose threats to groundwater users, 5-year reviews would be conducted to assess Site conditions and whether additional response actions would be necessary.

Two scenarios are viable under Alternative 2:

- Alternative 2A - All 29 currently affected residents would be provided with new storage tanks and delivered bulk water.
- Alternative 2B - The five homes with either an individual or cumulative risk for skin contact and breathing exposure pathways of greater than  $1E-4$  for a cancer related risk or an individual or cumulative HI greater than 1.0 for a non-cancer related risk would be provided with bulk water to prevent contact with contaminants through these pathways, and the remaining 24 affected homes would be provided with bottled water to prevent drinking of water in excess of MCLs.

Alternative 2 would be consistent with the federal and state chemical-specific ARARs for drinking water since bottled or bulk water that complies with MCLs would be provided to residences.

Alternative 2 would comply with the action-specific requirements under Title 29 of the Code of Federal Regulations for occupational safety and health since workers who perform the long-term monitoring wells or deliver bottled or bulk water would conform with these requirements.

The cost estimates developed for the two Alternative 2 scenarios are

Alternative 2A:

Capital costs: \$120,420  
Average annual operation and maintenance (O&M) costs: \$314,440 (years 1 through 30)  
Five-year reviews: \$23,000 per event  
Over a 30-year period, the net present-worth cost of Alternative 2A is \$4,071,951.

Alternative 2B

Capital costs: \$22,270  
Average annual O&M costs: \$140,200 (years 1 through 30)  
Five-year reviews: \$23,000 per event  
Over a 30-year period, the net present-worth cost of Alternative 2B is \$1,811,645.

**Alternative 3: Point-of-Entry Treatment**

This alternative calls for the use of point-of-entry treatment units to treat the extracted groundwater at each affected residence. Under this alternative, all 29 currently affected residents would be provided with point-of-entry treatment units. Water pumped from the private wells would be passed through the treatment systems at the point of entry into the homes. Each typical treatment system would be composed of a prefilter to remove suspended solids, dual in-series activated-carbon units to remove VOCs, and an ultraviolet (UV) radiation unit to provide disinfection. Depending on the contaminants identified at specific residences, additional treatment components may be required, such as pH adjustment or a water-softening unit to remove manganese and iron. The activated carbon would be replaced on a periodic basis or when breakthrough is identified. Through the provision of these treatment systems, contaminant concentrations would be reduced to below the drinking water criteria (MCLs).

Institutional controls such as ordinances or deed restrictions may be enacted to prohibit the use of contaminated groundwater for drinking water use, if treatment is not employed. Existing residential wells and selected monitoring wells would be incorporated into a long-term monitoring network to determine whether the water supplies of other residences may be affected and the status of groundwater contamination. Groundwater would be monitored annually for VOCs and metals. Because contaminants remain in the aquifer and would continue to pose threats to groundwater users, 5-year reviews would be conducted to assess site conditions and whether additional response actions are necessary.

Alternative 3 would be consistent with the federal and state chemical-specific ARARs since the point-of-entry treatment systems would be designed to produce potable water that meets the numerical limits (MCLs) identified in the primary drinking water

criteria.

Alternative 3 would comply with the action-specific requirements under Title 29 of the Code of Federal Regulations for occupational safety and health since workers who install and perform periodic maintenance of the treatment systems and workers who sample the long-term monitoring wells would conform with these requirements. The transport and disposal of spent activated carbon would be in compliance with the applicable portions of Resource Conservation and Recovery Act requirements (40 CFR Parts 262 and 263) and the applicable portions of the Hazardous Materials Transportation requirements (49 CFR 107, 171-179). All measures would be taken to safely remove and transport the spent carbon to a facility for regeneration.

The cost estimates developed for the Alternative 3 for the 29 residences are  
Capital costs: \$172,230

Average annual O&M costs: \$117,240 (years 1 through 30)

Five-year reviews: \$23,000 per event

Over a 30-year period, the net present-worth cost of Alternative 3 is \$1,676,700.

If more residences are provided point of entry treatment units costs will increase.

Capital costs for each additional residential filter are \$6,000 and O&M cost would increase approximately \$735 for each additional sample and analysis.

#### Alternative 4: Water Line

Under this alternative, the existing water distribution main from the nearby borough of Bally would be extended through Hereford and Washington Townships so that service lines could be provided to the 29 affected residences. Two construction scenarios were used in the cost estimating. One is called a branch system that would reach far enough to serve the 29 residences and the other is a looped system which would pass by the affected residents and continue along the roads in the vicinity of the Site. The extension would require excavations in or along public roadways, installation of the underground piping for the distribution main, installation of service lines to the property lines of affected residences, and connection of the service lines to the plumbing system within each household. Four booster pumping stations would be established to provide sufficient hydraulic head in the water supply in this area of very steep terrain. During construction of the water line extension, residences with contaminated groundwater in excess of MCLs or risk-based action levels would be provided temporarily with an alternate water supply (either bottled water or point-of-entry treatment systems).

It is anticipated that the Washington Township Municipal Authority would be the appropriate authority to operate and maintain the water distribution system. They currently have an agreement with the Bally Municipal Water Department to obtain water which could be used in this alternative. The Borough of Bally currently uses one of two supply wells to provide potable water to residential, commercial, and industrial

customers. The water department is interested in coordinating with the Washington Township Municipal Authority to expand its service by provide potable water to other customers. Bally obtains its water supply from the bedrock aquifer underlying the Borough. This aquifer appears to have been contaminated as the result of separate disposal activities associated with the Bally Superfund Site. Bally treats the water to meet drinking water quality criteria and sends the finished water into its distribution system.

Coordination among EPA, the Pennsylvania Department of Environmental Protection (PADEP), the Washington Township Municipal Authority, the borough of Bally, Hereford Township and Washington Township would be required for the construction of the water line extension and for administration and management of the extended water supply service. It is presumed that the administration, management, and long-term operation and maintenance of the supply well and treatment would remain the responsibility of the borough of Bally.

Institutional controls such as ordinances or deed restrictions may be employed to prohibit the use of contaminated groundwater for drinking water, if treatment is not employed. Existing residential supply wells and selected monitoring wells would be incorporated into a long-term monitoring network to determine whether the water supplies of other residences may be affected by groundwater contamination. Groundwater would be monitored annually for VOCs and metals. Because contaminants would remain in the aquifer and would continue to pose threats to groundwater users, 5-year reviews would be conducted to assess the status of Site conditions and to review risks.

Alternative 4 would comply with federal and state chemical-specific ARARs since the water line would furnish water that has been treated by the municipal water supplier to meet the primary drinking water criteria (MCLs).

During the implementation of Alternative 4, all reasonable measures would be taken during excavation and installation of the water line to comply with the federal and state ARARs. Measures would be implemented to avoid disturbance of any wetlands or impairment of the storage capacity of any flood plains. Prior to the initiation of construction, a review would be conducted to identify any endangered species or sensitive habitats that may be encroached by the installation of the water line. Should any historic or archeological artifacts or objects be encountered during construction, the appropriate federal and state agencies would be notified to coordinate measures that would preserve or mitigate any adverse effects that might be identified.

Alternative 4 would comply with the requirements under Title 29 of the Code of Federal Regulations for occupational safety and health since workers who install and perform periodic maintenance of the water line and workers who perform the sampling of the long-term monitoring wells would conform with these requirements. During

excavation and construction, erosion control measures would be implemented, as appropriate, to minimize sediment discharges into surface water bodies. Erosion control measures include silt fences, runoff collection and sedimentation ponds, surface water diversions, stabilization of slopes, channels, and ditches, and minimization of the exposed areas for earth-moving activities.

The cost estimate for implementation of Alternative 4 is

Capital costs: \$7,324,000  
Average annual O&M costs: \$117,240 (years 1 through 4)  
\$102,740 (year 5)  
\$88,240 (years 6 through 30)

Five-year reviews: \$23,000 per event

Over a 30-year period, the net present-worth cost of Alternative 4 is \$8,566,383 for a branched distribution system or \$11,140,151 for a looped distribution system.

Note: This alternative would not pay for residential water bills and these costs do not include the cost for service after installation.

## **VI. EVALUATION CRITERIA**

The four remedial alternatives described above were evaluated in detail to determine which would be the most effective in addressing the risks posed by the ground water, at the Site. EPA uses the nine criteria set forth in the NCP, 40 C.F.R. §300.430(e)(9)(iii) to evaluate remedial alternatives. These criteria are summarized below.

### **Threshold Criteria**

**Overall Protection of Human Health and the Environment:** Describes how the alternative, as a whole, achieves and maintains protection of human health and the environment, and how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

**Compliance with ARARs:** Addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements (ARARs) of Federal and State environmental laws an/or justifies invoking a waiver. ARARs may be waived for interim actions.

### **Primary Balancing Criteria**

**Long-Term Effectiveness and Permanence:** Considers the ability of the remedy to maintain reliable protection of human health and the environment over time once clean-up goals have been met.

**Reduction of Toxicity, Mobility, or Volume Through Treatment:** Describes the anticipated performance of the treatment technologies that may be employed in a

remedy.

**Short-Term Effectiveness:** Examines the effectiveness of alternatives in protecting human health and the environment during the construction and implementation of the remedy, until the clean-up levels are achieved.

**Implementability:** Evaluates the technical and administrative feasibility of alternatives and the availability of required materials and services.

**Cost:** Considers the capital and O&M costs of the alternatives.

### **Modifying Criteria**

**State Acceptance:** Indicates whether the State agency, based on its review of the Proposed Plan, concurs with, opposes, or has no comment regarding the preferred alternative.

**Community Acceptance:** The community's general response to the alternatives will be assessed in the Record of Decision following a review of the public comments received on the Administrative Record and the Proposed Plan.

The first two criteria (overall protection of human health and the environment and compliance with ARARs) are threshold criteria. The selected remedy must meet both of these threshold criteria (except when an ARAR waiver is invoked). The next five criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost) are the primary balancing criteria. The remaining two criteria (state and community acceptance) are referred to as modifying criteria. These last two criteria will be taken into account following the close of the comment period on this Proposed Plan.

## **VII. COMPARITIVE ANALYSIS OF ALTERNATIVES**

The following summary profiles the performance of the preferred alternative in terms of the nine criteria, noting how it compares to the other alternatives under consideration.

### **Overall Protection of Human Health and the Environment**

Alternatives 2, 3, and 4 would all prevent exposure to groundwater that is contaminated in excess of drinking water criteria or risk-based limits. .

### **Compliance with ARARs**

Alternatives 2, 3, and 4 would comply with chemical-, location-, and action-specific ARARs.



### Long-Term Effectiveness and Permanence

Alternatives 2, 3, and 4 would all reduce carcinogenic and noncarcinogenic risks to below or within the acceptable risk range for the long term. Under Alternative 2, increases in the levels of groundwater contaminants could potentially expose the drinkers of bottled water to unacceptable risks through the dermal contact or inhalation exposure pathways. Alternative 3 would be effective and reliable if the treatment system is properly operated and maintained. Alternative 4 would be effective and reliable and increases in groundwater contaminant concentrations would not affect the protection afforded by the new supply line.

### Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 2 would not treat the groundwater and would not reduce the toxicity, mobility, or volume of contaminated groundwater. Alternative 3 would treat an estimated 125 gallons of groundwater per person per day. The VOCs captured by the treatment would be disposed off-site. Alternative 4 would not treat water from the aquifer beneath the Crossley Farm Site. The contaminated groundwater that would be treated is associated with another NPL site in Bally Borough. The VOCs captured through this treatment would be vented to ambient air.

### Short-Term Effectiveness

Alternative 2 can be completed within 6 months. Alternative 2 is reliable, and no difficulties are expected through the construction and operation of the systems. Additional actions can be readily implemented if required after the 5-year review. Long-term monitoring would identify any additional homes with contaminated water supplies; bottled water could rapidly be provided to these homes on short notice.

Alternative 3 can be completed within 6 months. Alternative 3 would be slightly more difficult to construct than Alternative 2 and would require water deliveries in the near term until all the treatment units are installed. Additional actions can be readily implemented if required after the 5-year review. Long-term monitoring would identify any additional homes with contaminated water supplies. Point-of-entry treatment systems could be installed in these homes. However, bottled water would need to be provided until the systems were installed.

Alternative 4 can be completed within 2 to 4 years. Alternative 4 would be the most difficult to construct. Extensive excavations and construction would be required. In addition, considerable lead time would be needed for ordering and purchasing pumps and piping. Additional actions can be readily implemented if required after the 5-year review. Long-term monitoring would identify any additional homes with contaminated water supplies. These homes could be readily connected to the public water line, since the main distribution network would already be established. However, bottled water would need to be provided until the connections were made.

### Implementability

The technologies and equipment needed for the implementation of Alternatives 2, 3, and 4 are readily available. The deed restrictions associated with each alternative may be difficult to implement. For Alternative 2, coordination among agencies may be required for the delivery of water. For Alternative 3, coordination among agencies may be required for the installation and service of the treatment systems. For Alternative 4, coordination among various agencies and local municipalities would be required for the administration of the water distribution system, including the maintenance of the water lines and pump, the collection of fees, and service.

#### Cost

The costs for each alternative are summarized in the following table. For each alternative, \$23,000 would be every 5 years for reviews.

Cost Criteria	Alternative 1: No Action	Alternative 2: Delivered Water	Alternative 3: Point-of-Entry Treatment	Alternative 4: Water Line
Capital Cost	\$0	Alt. 2A: \$120,420 Alt. 2B: \$22,270	\$172,230 for	\$7,324,000 branched \$9,887,000 looped
Annual O&M	\$44,120	Alt. 2A: \$314,440 Alt. 2B: \$140,200	\$117,240 for	\$117,240 years 1-4 \$102,740 year 5 \$88,240 years 6-30
Present-Worth Cost	\$597,117	Alt. 2A: \$4,071,951 Alt. 2B: \$1,811,645	\$1,676,700	\$8,566,383 branched \$11,140,151 looped

#### State Acceptance

PADEP generally supports EPA's preferred alternative (Alternative 3) but reserves its final concurrence until community comments are evaluated.

#### Community Acceptance

Final evaluation of community acceptance of the preferred alternative will be conducted after the close of the public comment period. Comments received during the comment period will be addressed in the Responsiveness Summary section of the ROD.

### VIII. SELECTION OF EPA'S PREFERRED ALTERNATIVE

EPA's preferred alternative for addressing the contamination at the Site is Alternative 3, point of entry treatment systems for all residents who have had detections of contamination within the study area. Based on information currently available, this alternative appears to provide the best balance of trade-offs among the alternatives with respect to the criteria that EPA uses to evaluate alternatives. The point of entry treatment systems would provide a safe, reliable source of drinking water to those 29 residences discussed in this proposed plan and other residences that are currently impacted by the Site.

This alternative differs somewhat from the text in this proposed plan and EPA has made some different assumptions for costing purposes. At this time we are assuming 70 residences will be provided filtration units in for their water supply. This is based on water samples showing at least one detection of contamination in any of the previous sampling and analysis. The costing also assumes that 50 other residences in the study area will not need filtration units. Each of the 120 residences will be sampled every 6 months to determine if any changes in the filtration units should be made and if any additional units should be installed. The sampling program would also include selected monitoring wells and springs. This alternative assumes that the maintenance and sampling program would be implemented for a five year period and would be performed by EPA.

The cost estimate for implementation of this variation of Alternative 3 is:

Capital costs: \$425,473

Average annual O&M costs: \$305,920

Five-year reviews: \$23,000 per event

Over a 5-year period, the net present-worth cost of this Alternative is \$1,679,745

This action is considered a response to one of EPA's concern about the residential drinking water. EPA refers to this as an interim action for the Site. EPA's second concern is the potential soil, sediment, surface water contamination as well as the regional groundwater contamination. EPA is currently investigating these areas and when that study is completed EPA will propose a final remedy for the entire Site. The investigation is expected to continue through the summer of 1997 and final reports should be available by the Spring or Summer of 1998.

At that time, EPA will issue another proposed plan which will include some of the alternatives included in this plan and some new alternative for clean up of the regional groundwater contamination. Therefore this proposed remedy is considered temporary until the Remedial Investigation and Feasibility Study is finished.

## IX. COMMUNITY ROLE IN SELECTION PROCESS

EPA encourages comments from the public on all alternatives and on the information that supports the alternatives. Copies of the Administrative Record, which contains documents that EPA used in preparing this document, are available for review at the following **Information Repositories**:

U.S. EPA, Region 3  
841 Chestnut Building, 9th Floor  
Philadelphia, PA 19107  
Attn: Anna Butch (3HW01)  
(215) 566-3197

Hereford Township Municipal Building  
3131 Seisholtzville Road  
Macungie, PA  
(610) 845-2929

Washington Township Municipal Building  
128 Barto Road  
Barto, PA 19504  
(610) 845-7760

Although EPA is proposing a preferred alternative, no final decision has been made. For this reason, EPA is providing a public comment period, which begins on **February 10, 1997** and concludes on **March 12, 1997** on this Proposed Plan. EPA will hold a public meeting on March 5, 1997 at 7:00 p.m. at the Washington Township Elementary School to discuss this plan, to hear public comments, and to answer questions.

Written comments should be submitted to one of the following people by **March 12, 1997**:

Larry Brown (3HW02)  
Community Relations Coordinator  
U.S. EPA, Region 3  
841 Chestnut Building  
Philadelphia, PA 19107  
(215) 566-5527 or  
1-800-553-2509  
email: brown.larry@epamail.epa.gov

Roy Schrock (3HW22)  
Remedial Project Manager  
U.S. EPA, Region 3  
841 Chestnut Building  
Philadelphia, PA 19107  
(215) 566-3210  
email: schrock.roy@epamail.epa.gov

Following the conclusion of the thirty (30) day public comment period on this Proposed Plan, a Responsiveness Summary will be prepared. The Responsiveness

Summary will summarize and respond to significant public comments on the Proposed Plan. EPA will then prepare a formal decision document, the ROD, that summarizes the decision process and the remedy selected for the Site. This ROD will include the Responsiveness Summary. Copies of the ROD will be made available for public review in the information repositories. Once the formal decision document is approved, EPA will begin the implementation of the remedial design and remedial action for the Site.

## GLOSSARY

**Administrative Record** - EPA's official compilation of documents, data, reports, and other information that form the basis for the selection of a response action at a Superfund site. The record is placed in the information repositories to allow public access to the material.

**Applicable or Relevant and Appropriate Requirements (ARARs)** -

The requirements of federal and state environmental laws with which a selected remedy must comply.

**Preliminary Risk Assessment (PRA)** - The PRA is an essential component of the Focused Feasibility Study (FFS) Report. This portion of the FFS evaluates the carcinogenic and non-carcinogenic risks presented by the contaminants at a site if no remedial action is taken. Risk is calculated both for current uses and potential future uses of the property by a defined population, (i.e., residents in homes with contaminated drinking water supplies).

**Carcinogen** - A cancer-causing agent.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** -

A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act, codified at 42 U.S.C. §§ 9601 *et. seq.* The Act created a Trust Fund, known as the "Superfund," which is available to EPA to investigate and clean-up abandoned or uncontrolled hazardous waste sites.

**C.F.R.** - The Code of Federal Regulations.

**Groundwater** - Water found beneath the earth's surface that flows through the soil and rock openings and often serves as a source of drinking water.

**Hazard Index** - The ratio between the average estimated dose of a toxic substance received by a human population and the **reference dose**.

**Information Repository** - A location where documents and data related to a Superfund project are placed by EPA to allow the public access to the material.

**Inorganic compound** - A non-carbon based compound (e.g. metals).

**National Oil and Hazardous Substances Pollution Contingency Plan (NCP)** - The Federal regulation at 40 CFR Part 300 that guides the determination and manner in which sites will be cleaned up under the Superfund program.

**Organic compound** - A chemical comprised primarily of carbon and hydrogen.

**Plume** - A three dimensional area of groundwater containing site related contaminants.

**Record of Decision (ROD)** - A legal decision document that describes the remedial actions selected for a Superfund site, why certain remedial action(s) were chosen as opposed to others, how much they will cost, and how the public's comments about the Proposed Plan were incorporated into the final decision document.

**Reference Dose** - An average daily lifetime dose that is expected not to produce adverse effects in human populations.

**Remedial Investigation and Feasibility Study (RI/FS)** - A report composed of two scientific studies, the RI and the FS. The RI is a study to determine the nature and extent of contaminants present at a site and the problems caused by their release. The FS is conducted to develop and evaluate alternatives for the clean-up of a site.

**Responsiveness Summary** - A summary of oral and/or written public comments received by EPA during a comment period on key EPA documents, and EPA's responses to those comments. The Responsiveness Summary is a key part of the ROD, highlighting community concerns for EPA decision-makers.

**Superfund** - The name commonly used for CERCLA.

**Focused Feasibility Study (FFS)** - Study conducted to develop and evaluate alternatives for the residential drinking water supplies. The FFS at the Crossley Farm Site was conducted to evaluate remedial alternatives prior to the full RI/FS and selected remedy.